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ABSTRACT

A proposal is presented for a Community College of Philadelphia Life Sciences and Allied Health Services course in physical fitness. Following a standard cover form, a statement of purpose explains that the course is designed to provide instruction and experience in the basic areas of nutrition and physical conditioning, including dietary analysis, weight control programs, body composition, flexibility, cardiovascular endurance, and muscular strength and endurance. Next, course goals and a course outline are presented, and corresponding course-level objectives (CLO's) are identified. Finally, the CLO's, related intermediate performance objectives, learning activities, and measures of acceptable performance are presented. The five CLO's stipulate that the student will: (1) analyze physiological aspects of physical fitness (e.g., the cardiovascular, respiratory and muscular systems); (2) objectively determine his/her level of physical fitness; (3) analyze a sound nutritional program; (4) analyze selected approaches to physical fitness (e.g., specific exercises, and common pieces of fitness equipment); and (5) analyze principles of exercise prescription and food selection. A detailed course outline and sample instructional materials conclude the packet. (LAL)

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PRINCIPLES AND APPLICATIONS OF PHYSICAL FITNESS: COURSE PROPOSAL

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COMMUNITY COLLEGE OF PHILADELPHIA

COURSE PROPOSAL COVER FORM

Please use this cover form when submitting the entire course for approval. Attach the course design, objectives, and any other elements to this form.

Name of Proposal Writer David G. Yeo
Suggested Course Title Principles and Applications of Physical Fitness
Course Number
Related Program(s)
Recommended Course Starting Date Spring Semester, 1985
Days Yes Evenings No Weekends Yes
Is it offered every semester? Yes X No If no, when
Does this course replace another course? No X Yes If yes, name the course.

Department Name

Department Head Signature Date

Division Name Life Sciences and Allied Health Services

Division Director Signature Date

Provost Signature Date

Course Prerequisites None

Is this course open to all students meeting requirements? Yes
No If no. please explain.

Limit on Class Size:
A. Contract 30 Students per section
B. Laboratory Constraint
C. Clinical Constraint
Expected Enrollment
Special costs involved in offering this course (itemize)
Probably none

Lecture Hours None Laboratory Hours 45 Contact hours
Clinical Hours None Credit Hours
Career No General Education Yes Support Yes

Catalog Description

This course is designed to provide instruction and experience in the basic areas of nutrition and physical conditioning, to include dietary analysis, weight control programs, body composition, flexibility, cardiovascular endurance, and muscular strength and endurance. The student will develop the skills necessary to plan and implement a personal fitness program and weight control program based on their particular needs and personal goals. A basic understanding of weight training, body conditioning, weight control, and cardiovascular programs will be emphasized.

Principles and Applications of Physical Fitness

Statement of Purpose

Interest in physical fitness and nutrition was at an all-time high in 1984. There is no question that we are continuing the "fitness explosion" which began in 1967. While in 1961, only 21-23% of the population exercised regularly, 40-45% of the country's adults were exercising regularly in 1983. Half of the population claims they are following some form of "diet." Health spas, fitness centers, weight control programs, and exercise salons are continuing to spring up in varying localities around the country. The research literature concerned with longevity and quality living have strengthened the arguments of the proven benefits of prudent exercise and dietary habits.

Yet despite all the publicity, fanfare, and dissemination of information regarding fitness and nutrition, there remain erroneous beliefs, lack of knowledge, and significant confusion regarding proper approaches to physical fitness. We fail to understand our total needs, as well as how best to meet them. Many adults are basing their exercise-fitness-dietary action on popular misconceptions and unfounded premises, rather than on tested truths, facts, and principles.

Principles and Applications of Physical Fitness

Statement of Purpose (continued)

With the recent breakthroughs in exercise equipment, the advent of the field of sports medicine, and the laboratory findings involved with nutrition, there is a need to inform and update students with regard to their total fitness. This course is designed to help inform the students of the proper approaches, principles, and steps in developing and maintaining personal physical fitness. The course will help them understand the effects and benefits of specific exercise and nutritional programs. Students will be given the means of assessing their personal fitness status and needs, and the methods of prescribing their own dietary and exercise programs.

Principles and Applications of Physical Fitness

Goals

1. The student will learn a working knowledge of basic physiological aspects of physical fitness with regard to the functions and training effects of the cardiovascular, respiratory, and muscular systems. (CLO #I)
2. The student will develop ability to objectively ascertain his/her current level of physical fitness through the application of various standard tests of physical fitness. (CLO #II)
3. The student will learn a basic orientation of the components of a sound nutritional program, and will develop ability to evaluate various diets and weight control programs with regard to their physiological soundness, safety, and overall effectiveness. (CLO #III)
4. The student will become acquainted with numerous fitness exercises, programs, and pieces of equipment in terms of their claims and proven benefits. (CLO #IV)
5. The student will develop an understanding of designing individualized diet and exercise programs based upon personal goals and needs. (CLO #V)

Principles and Applications of Physical Fitness

Course Outline

I. Introduction to Physical Fitness (CLO #V)

A. Definitions of physical fitness

B. Objectives for fitness

C. Status of fitness in the United States

II. Components of Organic Fitness (CLO #I)

A. Cardiovascular endurance

1. Cardiac output

2. Collateral circulation

3. Blood pressure

4. Target heart rate

5. Atherosclerosis

6. Cardiac risk factors

7. Maximum oxygen uptake

B. Muscular strength and muscular endurance

1. Muscle tonus

2. Hypertrophy and atrophy

3. Muscle soreness and stiffness

4. Red and while muscle fibers

Principles and Applications of Physical Fitness

Course Outline (continued)

II. Components of Organic Fitness (cont'd.)

C. Flexibility

1. Static flexibility

2. Dynamic flexibility

3. Opposite muscle groups

D. Body composition

1. Lean weight versus adipose tissue

2. Percent body fat

3. Desirable body weight

III. Principles of Exercise (CLO #V)

A. Medical examination

B. Low energy warmup and stretching

C. Starting out gradually

D. Overload

E. Progression

F. Regularity of workouts

G. Specificity of training - SAID Principle (Specific Adaptation to Imposed Demands)

H. Factors of diet, fluids, rest, smoking, and alcohol

I. Motivation

J. Tapering off, cooling down

K. Use of good equipment, especially footwear

Principles and Applications of Physical Fitness

Course Outline (continued)

IV. Fitness Appraisal (CLO #II, #IV)

A. Cardiovascular endurance

1. 12-minute run
2. 1.5-mile run
3. Blood pressure
4. Step tests and hop tests
5. Vital capacity
6. Resting pulse
7. Bicycle ergometer and treadmill stress tests

B. Muscular strength and endurance

1. Sit-ups (one minute)
2. Push-ups (one minute)
3. Pull-ups
4. Straight arm hang
5. Selected weight training exercises

C. Flexibility

1. Sit-and-reach
2. Quadricep stretch

D. Body composition

1. Skinfold measurements
2. Girth and anthropometrical measurements

Principles and Applications of Physical Fitness

Course Outline (continued)

V. Conditioning for Physical Fitness (CLO #I)

A. "FITT" Principle: frequency, intensity, time, type

B. Aerobics versus anaerobics

C. Weight training

1. Isotonic and variable resistance

2. Isokinetic and accommodating resistance

3. Free weights versus machines

D. Static stretching and diet and fitness techniques

E. Interval training

F. Circuit training

G. Isometrics

H. Calisthenics

I. Sports conditioning

J. Exercise gimmicks

K. Fads, fallacies, and misconceptions of exercise

L. Effects of training on the cardiovascular, respiratory, and muscular systems

M. Hypokinetic disease

Principles and Applications of Physical Fitness

Course Outline (continued)

VI. Introduction to Diet and Nutrition (CLO #III)

A. Obesity and overweight: distinctions and extent of the problem

B. Dangers of obesity

C. Causes of overweight and obesity

D. Nutrients for health - food components and food groups

VII. Principles of Diet Selection and Weight Control (CLO #III, #V)

A. Counting calories and carbohydrates

B. Nutritional values of common foods

C. Facts versus fallacies concerning weight control

D. Set-point theory of weight control

E. Effects of exercise on weight control

F. Body composition changes

G. Analysis of common diets and diet supplements

1. Low carbohydrate
2. Vegetarian
3. Weight Watchers
4. Fasting
5. Pritikin
6. Cambridge

Principles and Applications of Physical Fitness

Course Outline (continued)

VII. Principles of Diet Selection and Weight Control (continued)

H. Methods of weight control

1. Exercises
2. Diet
3. Medication
4. Psychotherapy
5. Surgery

I. Pre-competition meal

VIII. Applying a Weight Control Program (CLO #V)

A. Writing a weight control program

B. Food-exchange guides

C. Weight control work sheet, daily caloric intake

D. Weight control program contract

E. Weight control program progress log

F. Keys to behavior modification

IX. Stress Management (CLO #V)

A. Type A and Type B personalities

B. Stress reduction techniques

C. Relaxation exercises

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Principles and Applications of Physical Fitness

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Yeo, D., and Rockwell, M. (editors). Dimensions of Human Movement. Dubuque, IA: W. C. Brown, 1983.

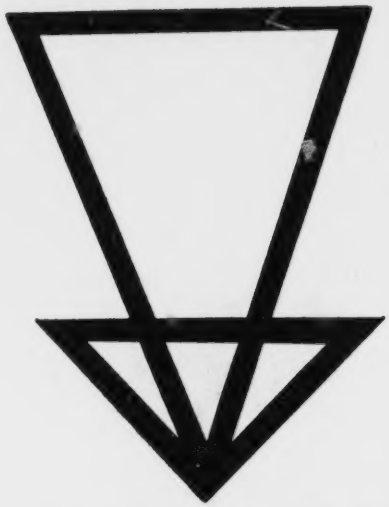
DHEW. Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention. DHEW (PHS), Publication Number 79-55071, 1979.

DHHS. Promoting Health, Preventing Disease: Objectives for the Nation.

Course Level Objective

Course/Package Name

Principles and Applications of Physical Fitness



CLO Identification

I

The student will analyze physiological aspects of physical fitness. To be rated as acceptable, the student must (1) state basic functions of the cardiovascular, respiratory, and muscular systems, (2) describe basic training effects of exercise upon the cardiovascular, respiratory, and muscular systems, and (3) identify basic effects of lack of exercise on the cardiovascular, respiratory, and muscular systems.

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # I

INTERMEDIATE PERFORMANCE OBJECTIVE# 1

The student will state basic functions of the cardiovascular, respiratory, and muscular systems. To be rated as acceptable, the student must (1) identify at least two functions of each system and (2) state at least three ways by which each system is related to maximum oxygen uptake.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text), pp. 13, 28, 36, 165	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 101-102, 106, 109-111	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # I

INTERMEDIATE PERFORMANCE OBJECTIVE# 2

The student will describe basic training effects of exercise upon the cardiovascular, respiratory, and muscular systems. To be rated as acceptable, the student must (1) describe what level of overload is necessary to cause the training effect on each system, (2) identify at least five training effects specific to each system, (3) name at least two objective tests to measure the extent of training effects on each system, and (4) identify at least six injuries or conditions which can result from doing too much exercise.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text), pp. 8, 37-39, 102-103	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 103-104, 107, 109-112, 118	Book	Individual
3.	View film, "Run Dick, Run Jane," Brigham Young University	16 mm. projector	Group
4.			
5.			

Course Level Objective

Course/Package Name

Principles and Applications of Physical Fitness

CLO Identification

II

The student will objectively determine his/her level of physical fitness. To be rated as acceptable, the student must (1) describe tests of physical fitness and (2) perform tests of physical fitness.

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # II

INTERMEDIATE PERFORMANCE OBJECTIVE# 1

The student will analyze tests of physical fitness. To be rated as acceptable, the student must (1) state which test of physical fitness is most commonly used to determine cardiovascular endurance, (2) name at least five tests of cardiovascular efficiency, (3) name at least four tests of muscular strength, (4) name at least three tests of flexibility, and (5) name two means of determining body composition.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text), pp. 14-35	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 108, 123, 139-145	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # II

INTERMEDIATE PERFORMANCE OBJECTIVE# 2

The student will personally perform classroom tests of physical fitness and compare their scores to appropriate norms. To be rated as acceptable, the student must (1) exectute the cardiovascular fitness test of blood pressure, resting pulse, 5-minute step test, 3-minute hop test, 1.5 mile run, and 12-minute run, (2) execute the respiratory efficiency test of vital capacity, (3) execute the muscular strength and endurance tests situps, pushups, and pullups, (4) execute the flexibility tests for hamstrings, quadriceps, and low back, and (5) execute the skinfold measurements for the triceps, subscalpualr, suprailiac, and abdominal sites.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text), pp. 14-35.	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 101, 106, 108, 123, 139-145	Book	Individual
3.	Read National Fitness Test Battery, National Fitness Foundation	Book	Individual
4.			

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Course Level Objective

Course/Package Name

Principles and Applications of Physical Fitness

CLO Identification

III

The student will analyze a sound nutritional program. To be rated as acceptable, the student must (1) describe the essential food components of a sound diet, (2) describe the essential food groups, (3) describe various diets and supplements which are available, (4) describe various weight control programs which are available, and (5) summarize the current nutritional status of Americans.

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # III

INTERMEDIATE PERFORMANCE OBJECTIVE# 1

The student will describe the essential food components of a sound diet. To be rated as acceptable, the student must (1) identify the six basic components of food, (2) state at least two functions of each identified component, (3) name at least two conditions which can result from a lack of a sound diet, and (4) name at least two conditions which can result from an excess of any two of the basic food components.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 55-58, 63	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 130, 133	Book	Individual
3.	View film, "Let's Eat Food," FLCC	16 mm. projector	Group
4.			
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # III

INTERMEDIATE PERFORMANCE OBJECTIVE# 2

The student will describe basic food groups essential to be a sound diet. To be rated as acceptable, the student must (1) identify the four basic food groups, (2) state the number of servings from each group which are recommended for adults, (3) state at least three aspects about the role of food exchanges in the food groups, (4) name at least two conditions which can result from a lack of proper balance among the food groups, and (5) identify at least six foods which are members of each food group.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 55-58, 63	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 130, 133, 135-137	Book	Individual
3.	View film, "Let's Eat Food," FLCC	16 mm. projector	Group
4.			

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # III

INTERMEDIATE PERFORMANCE OBJECTIVE# 3

The student will describe at least six diets which are currently popular. To be rated as acceptable, the student must (1) include at least three statements summarizing the foods to be consumed and avoided in each of the following: (a) Weight Watchers; (b) Pritikin; (c) Cambridge; (d) vegetarian; (e) low carbohydrate; and (f) fasting diets, (2) include at least two statements about advantages of each diet, (3) include at least two statements about the disadvantages of each diet, (4) explain at least four dangers of "fad diets," and (5) include at least two statements each about the supplements of vitamins, minerals, and protein.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 55-64	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 129-133	Book	Individual
3.			
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # III

INTERMEDIATE PERFORMANCE OBJECTIVE# 4

The student will describe weight control programs which are currently promoted (1984). To be rated as acceptable, the student must (1) state at least three disadvantages of dieting without exercising, (2) state at least three disadvantages of exercising without dieting, (3) state at least three dangers of fluid-loss approaches of weight control, (4) describe at least two psychotherapy approaches to weight control, and (5) state at least four reasons why all approaches to weight control are unsatisfactory except that of a controlled, well-balanced diet with regualr vigorous exercise.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 55-71, 89-92	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 128-133	Book	Individual
3.			
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # III

INTERMEDIATE PERFORMANCE OBJECTIVE# 5

The student will summarize the selected health problems as related to lifestyle in the United States. To be rated as acceptable, the student must (1) define obesity and state how prevalent it is, (2) define overweight and state how prevalent it is, (3) identify at least four causes of obesity, and (4) state the 1980 United States DA/DHSS Guidelines for Nutrition.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 56, 63	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 128-129	Book	Individual
3.	Read PCCC handout	Handout	Individual
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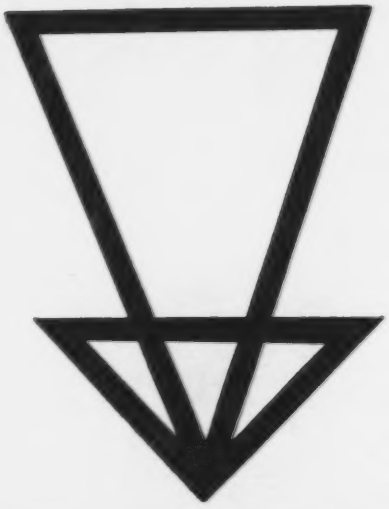
Course Level Objective

Course/Package Name

Principles and Applications of Physical Fitness



CLO Identification

IV

The student will analyze selected approaches to physical fitness. To be rated as acceptable, the student must (1) describe specific exercises, exercise programs, and common pieces of fitness equipment in terms of their claims and proven benefits and (2) describe the current status of physical fitness of Americans.

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # IV

INTERMEDIATE PERFORMANCE OBJECTIVE# 1

The student will describe exercises that can be done for general conditioning. To be rated as acceptable, the student must (1) identify at least five exercises that can be done with free weights for upper body, (2) identify at least five exercises that can be done with machines for upper body, (3) identify at least three exercises that can be done with free weights for the lower body, (4) identify at least four exercises that can be done with machines for the lower body, and (5) identify at least six exercises that can be done without equipment for low back pain.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for All, An Individualized Approach, by Allsen, et al., (text) pp. 11-147	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 118-121	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # IV

INTERMEDIATE PERFORMANCE OBJECTIVE# 2

The student will explain at least two benefits and at least two disadvantages of at least ten common exercise programs. To be rated as acceptable, the explanation must include statements about (1) jogging, (2) aerobic dancing, (3) weight training, (4) calisthenics, (5) flexibility exercising, (6) swimming, (7) walking, (8) playing tennis, (9) bicycling, and (10) bowling.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 100-108, 148-153	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 113, 115-123	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # IV

INTERMEDIATE PERFORMANCE OBJECTIVE# 3

The student will explain at least two basic concepts, at least two advantages, and at least two disadvantages of right pieces of exercise equipment. To be rated as acceptable, the explanation must include statements about (1) Nautilus, (2) Universal Gym, (3) bar bells, (4) dumb bells, (5) CAM II, (6) stationary bicycles, (7) mini-tramps, and (8) Cybex.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 111-124, 148-153	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 118-120	Book	Individual
3.	Read "Principles and Techniques of Conditioning," Yeo handout	MCCC #40	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # IV

INTERMEDIATE PERFORMANCE OBJECTIVE# 4

The student will describe the current status of physical fitness in the United States. To be rated as acceptable, the student must (1) state at least three aspects about approaches to fitness, (2) name the three leading causes of death in the United States, (3) compare at least two differences between fitness trends of today and trends of fifteen years ago, and (4) state at least three definitions of physical fitness.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 3-10	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 93-98	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # IV

INTERMEDIATE PERFORMANCE OBJECTIVE# 5

The student will personally execute selected fitness exercises. To be rated as acceptable, the student must perform (1) at least six flexibility exercises, (2) at least three warmup exercises, (3) walking, (4) jogging, (5) pushups, (6) situps, (7) rope skipping, (8) selected relays and fitness games, (9) running, (10) isometrics, and (11) at least two relaxation exercises.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 135-147, 156-160	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 113, 115-116, 121	Book	Individual
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Course Level Objective

Course/Package Name

Principles and Applications of Physical Fitness

CLO Identification

V

The student will analyze principles of exercise prescription and food selection. To be rated as acceptable, the student must (1) explain principles of training, (2) explain principles of caloric balance, (3) explain keys to behavior modifiction, and (4) define overall fitness.

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # V

INTERMEDIATE PERFORMANCE OBJECTIVE# 1

The student will describe basic principles of training. To be rated as acceptable, the description must include at least two statements each about (1) medical exam, (2) warmup, (3) progression, (4) overload, (5) frequency, (6) specificity, (7) motivation, (8) cool down, (9) proper equipment, and (10) personal objectives.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 36-50	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) p. 99	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # V

INTERMEDIATE PERFORMANCE OBJECTIVE# 2

The student will identify at least three principles of caloric balance. To be rated as acceptable, the student must (1) equate calories to pounds and specific foods, (2) describe how to determine caloric intake and caloric expenditure, and (3) describe at least three factors governing metabolism.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 55-98, 171-176	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 128-132	Book	Individual
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COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # V

INTERMEDIATE PERFORMANCE OBJECTIVE# 3

The student will explain selected factors of behavior modification as they relate to weight control. To be rated as acceptable, the explanations must include at least two statements about (1) cues, (2) emotions, (3) record keeping, (4) dietary evaluation, (5) reinforcement, and (6) goals.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 89-98	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 131-132	Book	Individual
3.			
4.			
5.			

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # V

INTERMEDIATE PERFORMANCE OBJECTIVE# 4

The student will define overall fitness. To be rated as acceptable, the definition must include components of (1) flexibility, (2) muscular strength, (3) muscular endurance, (4) cardiovascular endurance, (5) body composition, and (6) relaxation.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 3-10	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 93-95	Book	Individual
3.			
4.			
5.			

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # V

INTERMEDIATE PERFORMANCE OBJECTIVE# 5

The student will define a Type A personality and a Type B personality.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) PP. 149-150	Book	Individual
2.			
3.			
4.			
5.			

COURSE/PACKAGE NAME Principles and Applications of Physical Fitness

COURSE LEVEL OBJECTIVE # V

INTERMEDIATE PERFORMANCE OBJECTIVE# 6

The student will name at least three stress reduction techniques.

NO.	STUDENT ACTIVITIES	MEDIA	METHOD
1.	Read Fitness for Life, An Individualized Approach, by Allsen, et al. (text) pp. 156-160	Book	Individual
2.	Read Dimensions of Human Movement, Yeo and Rockwell (eds.) pp. 62-70	Book	Individual
3.			
4.			
5.			

Principles and Applications of Physical Fitness

Measurement Strategies

CLO I, III, IV, V

Administer written exam.

CLO II

Administer written assignments:

Cardiovascular Endurance Test Work Sheet, text, p. 178
Cardiovascular Endurance Program Work Sheet, p. 181
Body Weight Work Sheet, p. 179
Strength and Flexibility Appraisal Work Sheet, p. 180
Strength and Flexibility Program Work Sheet, p. 188

CLO III

Administer written assignments:

Dietary Evaluation Work Sheet, p. 184
Weight-Control Work Sheet, p. 185

CLO IV

Administer written assignments:

Dimensions of Human Movement, p. 158

CLO V

Administer written assignment:

Dimensions of Human Movement, pp. 159-160

Abington Memorial Hospital,
North Willow Grove Sports Medicine Center

June, 1984

PRINCIPLES AND TECHNIQUES OF CONDITIONING

Dr. David G. Yeo

Certified Athletic Trainer, Associate Professor, Department Chairman of Health & P.E.
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I. Introduction
   A. The two most important areas of athletic training are conditioning and rehabilitation.
   B. Three main causes of injury are lack of flexibility, muscle imbalance, and overuse, and they are all due to improper training techniques.
   C. Approximately 75% of injuries can be prevented through conditioning.
   D. There is no one specific way of conditioning, but the different training techniques and programs that are successful are developed from the same principles.

II. Objectives of Conditioning
   A. To prevent injury, by properly increasing the tolerance for work.
      1. Lack of flexibility encourages muscle strains, tendinitis, shin splints, sprains, and cramps.
      2. Muscle imbalance encourages muscle strains and pulls.
      3. Ligaments and tendons can be "toughened" and made "more dense" through exercise (debatable).
      4. Muscle strength and bulk protect muscles, joints, and other soft tissue. Muscles are the primary shock absorbers.
      5. Improper timing can contribute to injuries.
   B. To increase performance, by properly achieving a high level of physical fitness. With fatigue and weakness:
      1. Tissues are less elastic.
      2. Less strength to protect joints.
      3. Less strength to perform skills properly.
      4. And, a high level of fitness encourages an optimal environment for healing to occur if there is an injury.
   C. To improve performance by increasing the athletes' mental attitude. Good conditioning helps in individual and team toughness, determination, discipline, and spirit.

III. Principles of Conditioning
   A. Medical exams for all athletes, with special concern for heart, eyes, epilepsy, previous concussions, diabetes, high blood pressure, blackouts, allergies, asthma, heat problems, and old injuries.
   B. Pre-season fitness testing: flexibility, strength, endurance, agility, speed, lean body mass, muscle imbalance.
      1. Testing indicates who is physically ready to be coached.
      2. Testing helps decide how much time to spend on fitness and how much on skill.
   C. Low energy warmup.
      1. Extremely essential to prevent muscle pulls and strains.
      2. Effects: increase in flexibility of connective tissue, increase in synovial fluid of joints, increase in circulation and respiratory rate, readying of blood sugar and adrenalin, increase in temperature of deep muscle to improve muscle excitability and contractility, avoidance of sudden change in blood pressure, psychological preparation, decrease of muscle viscosity, increase in metabolic processes and dissociation

of O_2 from the hemoglobin, speedup in transmission of nerve impulses.

3. Warm up to the point of sweating. Klafs and Arnheim suggest approximately 20 minutes.
4. Types of warmup.
   a. Informal - general stretching, light jogging.
   b. Formal - those motions related to the sport.

D. "Train, don't strain." Start out gradually and build up gradually.
1. The first 3-4 weeks are the most dangerous period in any sport.
2. Fitness before plays.
3. Overuse syndrome: tendinitis, shin splints, synovitis, strains, fasciitis, chronic soreness, blisters, heat exhaustion, heat stroke, stress fractures, chondromalacia.
4. For athletes, peak conditioning requires approximately 7-12 weeks (very dependent upon starting condition and response rate of the athlete).

E. Overload--presenting an adequate challenge to the body for physiological stress. Alternate hard and easy days. Achieve overload by:
1. Increasing resistance or intensity.
2. Increasing the rate of work.
3. Increasing the duration of work (repetitions).
4. Decreasing the rest intervals between exercises.

F. Progression--progressively more work must be performed for continual improvement.

G. Specificity of training. SAID Principle: Specific Adaptation to Imposed Demands.
1. The effects of training are specific to the type of training used. Specific exercise, muscle, sports, objectives, skills.
2. What are your objectives: strength, muscular endurance, explosiveness, cardiovascular endurance, or flexibility? or agility? etc.
3. Condition specific body areas to the appropriate sport.

H. Disuse atrophy.
1. Five workouts per week to achieve fitness.
2. At least three workouts per week to maintain basic fitness.
3. The higher the level to be maintained, the more frequent and intense must be the workout.
4. Prevent the athlete from becoming "soft" -- year around conditioning. Encourage play in organized leagues. Loss of 10-15% of fitness for every week on inactivity. 50% reduction in CV fitness after 4-12 weeks of detraining.

I. Proper diet and rest; no smoking; limited alcohol; unlimited water.

J. Tapering off, cooling down; 3-5 minutes.

K. Use of good equipment.

L. Apply ice, compression, elevation to most injuries.

M. MOTIVATION. Sell the program. Educate the athlete as to what he is trying to do and how he should do it. Tell them the "whys".
1. "Psyche" the athlete. Get him to see his long range realistic goals. Encourage the unsure athlete to reach his peak performance.
2. Short, intense, varied, and specific program, rather than long and boring workouts. 1 1/2 - 2 hour practices.
3. Change program every 3-6 weeks to prevent staleness and to meet changing strength, flexibility, and endurance levels.
4. Anticipate plateaus.
5. Set up a time when the facility can be used, especially consider the women. Schedule the program so it does not interfere with other school events.

6. Keep times on 40 yd. sprint, 440, half mile, and weight training strength levels. Test them!
7. Check summer workout cards.
8. Use letters, notes, bulletin boards, sign-in sheets, trophies.
9. Participate yourself in the workouts.
10. Gain their respect. Be confident in what you are doing. Convince them that what they are doing is right.
11. Account for individual differences.

N. Go light the day before a game.
O. Insure the development of the 5 components of physical fitness.

IV. Flexibility
A. Gain necessary mobility in early off-season, not the first day of pre-season.
B. Lack of flexibility (especially in ankle plantar flexors, knee flexors, hip flexors, low back extensors, shoulder internal rotators) facilitates early fatigue, difficulty in performing certain motions, and unnecessary injury (strains, sprains, tendinitis).
C. For what sport are you training? Flexibility for swimming ≠ gymnastics ≠ baseball.
D. Types of stretching.
1. Ballistic (bouncing). Possible muscle tears.
2. Static. Stretch slowly (active or passive). Hold at the point of "stretch" for 10-30 seconds. Increase time up to 1-2 minutes of holding. Repeat 3-10 times, 2-3 times per day.

D. Too much flexibility (in knees, elbows, shoulders, and low back) leads to an increased chance of sprains and dislocations. Any increase in flexibility must be met with an equal increase in strength, or with protective taping, to insure joint stability.
E. Exercise opposite motions also.
F. Stretching should be done as part of warmup and at end of workout.

V. Muscular Strength and Endurance Training
A. Isotonic - work performed with a change in muscle length; resistance remains at a constant level; a dynamic contraction.
1. For muscular strength, 3 sets of 4-6 reps. Off season, 1 hour, 8 lifts. Or, 8 reps, add weight, 6 reps, add weight, 4 reps.
2. For muscular endurance, 3 sets of 15-20 reps.
3. For strength and endurance, 3 sets of 8-10 reps. Or, 10 RM, drop wt., 10 RM, drop wt., repeat 10-10-10 = 50 reps, no rest. Or, 5 reps 75 lbs., 5 reps 90 lbs., 5 reps 100 lbs (maximum you can do). Or, 3 sets of 10: 1st set at 1/2 max., 2nd set at 3/4 max., 3rd set at max.
4. Inseason: bench press, military press, sitting leg press, dead lift. 20 minutes.
5. Preseason: 4 above, plus upright rowing, overhead pull downs, knee flexion, half squat, clean and jerk.
6. Speed of movement: 1/3 maximum, with correct form.
7. Concentric contraction = muscle shortens. Eccentric contraction = a lengthening contraction ("negative work"). Equal increases in strength, though eccentric contractions can be performed with 5-7 times less expenditure of muscular energy.
8. Variable resistance: resistance varies through the range of motion (Nautilus, Centurion, Gladiator, DVR, Polaris, Soloflex, Paramount).

B. Isometric - work performed with no change in muscle length; a static contraction. Muscle contracts without movement of body part.

1. Technique
   a. Intensity is near maximum.
   b. Gradual increase and release of pressure.
   c. Do not hold breath (Valsalva effect; lack of oxygen to heart).
   d. At least 3 positions, selected for best skill and strength improvement.
   e. Hold for 6-10 seconds.
   f. Perform one workout per day.
   g. Stabilize and minimize muscle substitution.
2. Advantages
   a. Improvement in muscular strength and size can be noted within 1 week.
   b. Program can be accomplished in short periods of time.
   c. No equipment is essential. Can be done anywhere.
   d. Appropriate for both sexes, all ages up to 50.
   e. Specific muscle can be exercised.
3. Disadvantages
   a. Does not develop or improve muscular endurance.
   b. Does not result in increased cardiovascular endurance.
   c. Gain in strength is only at the specific angle at which the muscle is exercised.
   d. Retention of strength is questioned.
   e. It is difficult to measure gains; tough motivation.
   f. Must be done everyday.
   g. Overstrain or improper technique can result in muscle strain.
   h. Causes a sudden rise in blood pressure which could be dangerous.

C. Isokinetic - work performed with a controlled maximum speed of movement so that resistance is accommodating to the maximum muscle loading at every point in the range of motion. (no eccentric work).
   1. Loading
      a. Special equipment needed (Mini-Gym, Orthotron, Fitron, Kinitron, Cybex, Apollo, CAM II, Hydra-Gym, Omni-Tron, Kin/Com).
      b. Maximum work at variable speeds.
      c. Specific speed can be chosen for the skill.
   2. Research is inconclusive as to superiority over other methods.

D. General Rules for Strength Training Programs
   1. Keep records.
   2. Insure proper warm-up and stretching.
   3. Establish starting loads carefully.
   4. Enforce work load progression.
   5. Rest 2 minutes between sets.
   6. Alternate upper and lower body.
   7. Maintain proper stance and form.
   8. Exercise through the full range of motion.
   9. Do heavy lifting in off-season.
   10. Stress extensors more than flexors. Know what muscles are involved.
   11. Inhale at start, exhale while returning to starting position.
   12. Stress safety: move weights in a crouched position, spotters for bench press and squats, no all-out lifting without mastering the skills, no more than 1 maximum workout per week, keep collars tight, no lifting alone, keep back flat, head erect, avoid bridging, orderly conduct, no lifting if injured.
   13. Work out 3-4 times/week (every other day), 1 hour limit.

VI. Cardiovascular Endurance

A. CV endurance may be the single most important element in winning; it is of tremendous value physically and psychologically.

B. 6-8 weeks of endurance training are required to bring about CV training effects. It will take longer to develop a high level of cardiovascular fitness.
C. Start endurance training in early off-season with long slow distances.
D. As the pre-season nears, shorten the distances to coincide with the nature of the sport.
E. Pre-season test to determine individuals endurance (12 min. run).
F. Determine loading by heart rate.
   1. 150 beats/min. for 20 minutes.
   2. 75% of maximum heart rate for 20 minutes.
      (maximum heart rate = 220 minus age)
   3. Resting HR + [(Max. HR - resting HR) X .60] for 20 minutes.
   4. Double resting HR for 20 minutes.
   5. 50-85% of VO_2 max.
   6. 60-90% of max. heart rate.
G. Running cross country and on slightly uneven terrain tends to improve the stability of the ankles and knees.
H. Uphill or step intervals tends to shorten the stride. Downhill intervals tend to lengthen the stride.

VII. Interval Training

Short, repeated, and intense periods of exercise (HR of 160-180) alternated with short, prescribed periods of recovery (HR of 100-120).

A. "The best methods by which to gain cardiovascular endurance."
B. Examples: Run 440 in 70 secs, jog 2 min., repeat 6 times.
   Sprint 40 yds., rest 30 sec., repeat 9 times.
C. Variables:
   1. Type of activity during the exercise bout and rest interval.
   2. Intensity of activity during exercise and recovery.
   3. Distance or duration of exercise bout.
   4. Duration of recovery interval.
   5. Number of repetitions of the exercise bout.
D. Advantages
   1. A greater amount of work can be performed in a shorter period of time with greater physiological effects. The recovery interval avoids excessive production and accumulation of fatigue products. The repeated attainment of peak values of stroke volume provides a greater stimulus for improving maximum oxygen uptake than do continuous types of training.
   2. The amount of overload can be regulated, thus permitting rapid progress.
   3. Can be adapted to any facility or available time.
   4. Built-in motivation: challange of the pace or time.
E. Energy systems
   1. ATP-PC: less than 30 seconds.
   2. ATP-PC and Lactic Acid: 30 seconds - 1½ min.
   3. Lactic Acid and Aerobic: 1½-3 min.
   4. Aerobic: greater than 3 min.

All 4 energy systems contribute ATP during performance of every activity; one of the systems contributes more during one activity than the other systems, and should be enphasized during the conditioning program.

VIII. Circuit Training
- A. Different exercises are performed at different "stations" which are in a specific sequence.
- B. There is a time limit to perform a certain number of reps, or the total number of reps performed without regard to time is established for each exercise, or a set circuit is completed within a time limit. Typically there are 8-15 stations; perform circuit 3 times. (If weights are used, usually 10-15 reps, or 40% of 1 RM).
- C. Set-up of Circuit
  1. Exercises selected for a specific purpose.
  2. Exercises arranged within the circuit to ensure functioning of different muscle groups.
  3. Exercises are performed with little (30 seconds) or no rest between stations.
  4. Effort expended in the accomplishment of the third lap should approximate maximum effort.
  5. With improvement, new training doses and completion times are established.
  6. For cardiovascular training effects (peripheral heart action circuit), do 12-20 reps of 60-70% of maximum lift, 10-12 stations, 30 seconds per station, no rest between stations, 25-30 minute workout.
- D. Advantages
  1. Can be made to fit many goals: agility, strength, endurance, flexibility, etc.
  2. Provides direct information for evaluation.
  3. Can be adapted to facilities and equipment.
  4. Can be accomplished within a relatively short period of time.
  5. Can be tailored to the individual.

IX. Masculinization in Weight Training for Women
- A. For women, there is usually no masculinization (development of muscle bulk) with weight training because of:
  1. A lack of male hormones (androgen, testosterone) responsible for muscle enlargement.
  2. Fewer muscle fibers within the muscle groups; smaller muscle size.
  3. A greater percentage of subcutaneous fat which "covers over" muscle development.
- B. Masculinization among selected individuals is caused by a combination of:
  1. An abnormally high level of the male hormone androgen.
  2. Possible use of anabolic steroids.
  3. Possible injections of testosterone.
  4. A very high intensity of physical work (2-4 hours, daily, heavy weight).
  5. A very low level of body fat.
  6. A "pumped up" state of muscle tonus, posed or flexed.

X. Body Composition (Percent Body Fat)
- A. The percentage of total body weight that is fat tissue is the best criterion for evaluating the quality of body weight.
- B. The skinfold measurement technique of estimating percent of body fat involves measurements commonly taken at several body sites: triceps, biceps, suprailiac, and subscapular.
- C. Average males, ages 17-29, have 15-17% body fat.
  Average females, ages 17-29, have 23-28% body fat.
- D. Female athletes typically have approximately 15-20% body fat.
  Male athletes typically have approximately 10-12% body fat.

XI. Conditioning Athletes is a Year Around Program. Objectives for the year:

A. Pre-season
   1. Flexibility
   2. Strength 1 day/week
   3. Endurance 3 days/week
   4. Skill work
   5. Situation work

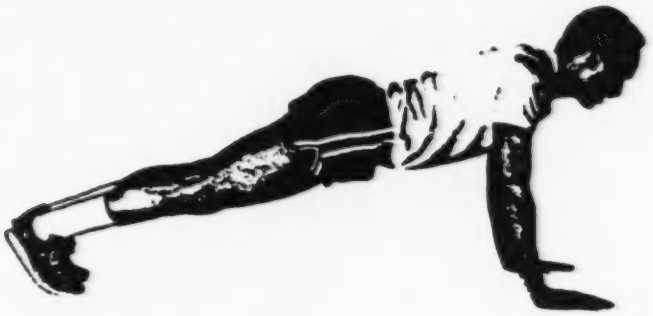
B. In-season
   1. Flexibility
   2. Extra work for subs
   3. Overload training specific to nature and speed of the sport; high speed strength work, 2 days per week, 4 lifts, 4-6 reps, 2 sets.

C. Off-season
   1. Early
      a. Power work, strength
      b. Intense stretching
      c. Overload skill drills
      d. Over distance running, 2-3 miles, 8-9 min. mile.
   2. Mid
      a. 3 sets of 10 for strength work
      b. Maintain gained flexibility
      c. Light overload skill drills
      d. Distance running 2 days/week
      e. Interval training 1 day/week
      f. 2 miles, 7½-8 min. miles
   3. Late
      a. 2 sets of 10, faster movement
      b. Maintain flexibility
      c. Interval training, 220's and 440's (35-45 sec. 220).
      d. Distance: 3 miles, 23-26 min., 5 days M-F; or 2 miles in 14 min.

XII. Conditioning and Legal Liability

A. Pre-season physical exam.
B. Proper conditioning. You must have a pre-season period of conditioning. NO HEAT STROKE.
C. Proper instruction - trampoline, tackling, wrestling.
   1. Content (warning of dangers and risks; use signs.
   2. Methodology (matching, maturity, ht., and wt.)
   3. Progression (size, age, skill, experience)
D. Proper supervision
   1. Warmup
   2. Spotting
   3. Safety
   4. Officials
   5. Reentry after serious illness or injury
E. Proper equipment (bats, helmets, pads, face masks, sneakers) and playing conditions (mats, slippery floor, lightening).
F. Prepared and equipped training room and first aid kit.
G. Perform proper first aid. Two biggest mistakes: moving a seriously injured athlete unecessarily, and permitting reentry into a game or practice after a serious head injury.
H. Parents' permission.
I. Insurance for injury and travel.
J. Removal of apparatus not in use.

"Conditioning is a lot like life -- you get out of it what you put into it."



PUSH-UPS FITNESS STANDARDS FOR MEN (Number Completed)

AGE	18-29	30-39	40-49	50-59	60 & Over
GOLD	>50	>45	>40	>35	>30
SILVER	25-50	22-45	19-40	15-35	10-30
BRONZE	<25	<22	<19	<15	<10

< = less than > = more than

PUSH-UPS FITNESS STANDARDS FOR WOMEN (Number Completed)

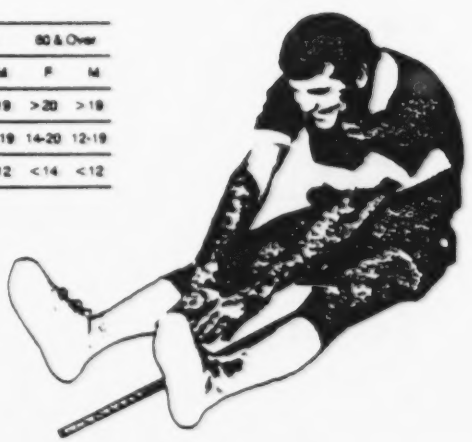
AGE	18-29	30-39	40-49	50-59	60 & Over
GOLD	>45	>40	>35	>30	>25
SILVER	17-45	12-40	8-35	8-30	5-25
BRONZE	<17	<12	<8	<8	<5

< = less than > = more than

SIT & REACH FITNESS STANDARDS (Inches)

AGE	18-29		30-39		40-49		50-59		60 & Over	
SEX	F	M	F	M	F	M	F	M	F	M
GOLD	>22	>21	>22	>21	>21	>20	>20	>19	>20	>19
SILVER	17-22	13-21	17-22	13-21	15-21	13-20	14-20	12-19	14-20	12-19
BRONZE	<17	<13	<17	<13	<15	<13	<14	<12	<14	<12

< = less than > = more than



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ARM HANG FITNESS STANDARDS (Minutes)

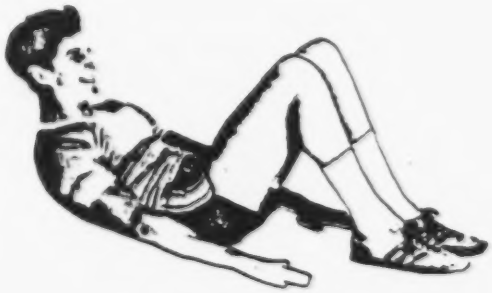
AGE	16-29		30-39		40-49		50-59		60 & Over	
SEX	F	M	F	M	F	M	F	M	F	M
GOLD	>1:30	>2:00	>1:20	>1:50	>1:10	>1:35	>1:00	>1:20	>:50	>1:10
SILVER	1:30 :46	2:00 1:00	1:20 :40	1:50 :50	1:10 :30	1:35 :45	1:00 :30	1:20 :35	:50 :21	1:10 :30
BRONZE	<:46	<1:00	<:40	<:50	<:30	<:45	<:30	<:35	<:21	<:30

< = less than > = more than

CURL-UPS FITNESS STANDARDS (Number Completed)

AGE	16-29		30-39		40-49		50-59		60 & Over	
SEX	F	M	F	M	F	M	F	M	F	M
GOLD	>45	>50	>40	>45	>35	>40	>30	>35	>25	>30
SILVER	25-45	30-50	20-40	22-45	16-35	21-40	12-30	18-35	11-25	15-30
BRONZE	<25	<30	<20	<22	<16	<21	<12	<18	<11	<15

< = less than > = more than



3-MINUTE STEP FITNESS STANDARDS (Heart Rate)

AGE	18-29		30-39		40-49		50-59		60 & Over	
SEX	F	M	F	M	F	M	F	M	F	M
GOLD	<90	<75	<94	<78	<98	<80	<102	<85	<105	<90
SILVER	90-110	75-100	94-118	78-109	98-118	80-112	102-123	85-119	105-127	90-116
BRONZE	>110	>100	>118	>109	>118	>112	>123	>119	>127	>116

< = less than > = more than

1-1/2 MILE RUN Fitness Standards
(Minutes)
AGE & SEX

FITNESS RATING	18-29		30-39		40-49		50-59		60 & Over	
	F	M	F	M	F	M	F	M	F	M
GOLD	<12:30	< 9:45	<13:00	<10:00	<13:45	<10:30	<14:30	<11:00	<16:30	<11:15
SILVER	12:30 15:54	9:45 12:00	13:00 16:30	10:00 12:30	13:45 17:30	10:30 13:00	14:30 19:00	11:00 14:30	16:30 19:30	11:15 16:15
BRONZE	>15:54	>12:00	>16:30	>12:30	>17:30	>13:00	>19:00	>14:30	>19:30	>16:15

< = less than > = more than

NORMAL VITAL CAPACITY (C.C.)–ADULT MALES[1]

Standing Height in Inches	AGE IN YEARS						Standing Height in cm.
	20	30	40	50	60	70	
60	3885	3665	3445	3225	3005	2785	152.4
62	4154	3925	3705	3485	3265	3045	157.4
64	4410	4190	3970	3750	3530	3310	162.5
66	4675	4455	4235	4015	3795	3575	167.6
68	4940	4720	4500	4280	4060	3840	172.7
70	5206	4986	4766	4546	4326	4106	177.8
72	5471	5251	5031	4811	4591	4371	182.9
74	5736	5516	5296	5076	4856	4636	188.0

NORMAL VITAL CAPACITY (C.C.)–ADULT FEMALES[1]

Standing Height in Inches	AGE IN YEARS						Standing Height in cm.
	20	30	40	50	60	70	
58	2989	2809	2629	2449	2269	2089	147.3
60	3198	3018	2838	2658	2478	2298	152.4
62	3403	3223	2043	2863	2683	2503	157.4
64	3612	3432	3252	3072	2892	2710	162.5
66	3822	3642	3462	3282	3102	2922	167.6
68	4031	3851	3671	3491	3311	3131	172.7
70	4270	4090	3910	3730	3550	3370	177.8
72	4449	4269	4089	3909	3729	3549	182.9

To measure vital capacity, the subject exhales maximally after a maximum inhalation. Expiration should be slow, even, forced and complete. Variations must be at least 20% below predicted normal to be regarded as subnormal. Reductions in the vital capacity may reflect the degree of functional impairment which may ensue with progressive pulmonary disease or inefficiency. An increase in vital capacity on the other hand may reflect the degree of improvement achieved by either acute or long term fitness measures.

1. Grune and Stratton, *Clinical Cardiopulmonary Physiology*. 2nd Ed., New York: Kory & Smith, 1975.

3-Mile Walking Test (No Running)

Time (Minutes)

Fitness Category		Age (years) 13–19	20–29	30–39	40–49	50–59	60+
I. Very poor	(men)	>45:00*	>46:00	>49:00	>52:00	>55:00	>60:00
	(women)	>47:00	>48:00	>51:00	>54:00	>57:00	>63:00
II. Poor	(men)	41:01–45:00	42:01–46:00	44:31–49:00	47:01–52:00	50:01–55:00	54:01–60:00
	(women)	43:01–47:00	44:01–48:00	46:31–51:00	49:01–54:00	52:01–57:00	57:01–63:00
III. Fair	(men)	37:31–41:00	38:31–42:00	40:01–44:30	42:01–47:00	45:01–50:00	48:01–54:00
	(women)	39:31–43:00	40:31–44:00	42:01–46:30	44:01–49:00	47:01–52:00	51:01–57:00
IV. Good	(men)	33:00–37:30	34:00–38:30	35:00–40:00	36:30–42:00	39:00–45:00	41:00–48:00
	(women)	35:00–39:30	36:00–40:30	37:30–42:00	39:00–44:00	42:00–47:00	45:00–51:00
V. Excellent	(men)	<33:00	<34:00	<35:00	<36:30	<39:00	<41:00
	(women)	<35:00	<36:00	<37:30	<39:00	<42:00	<45:00

* < Means "less than"; > means "more than."

The Walking test, covering 3 miles in the fastest time possible *without running*, can be done on a track over any accurately measured distance. As with running, take the test after you have been training for at least 6 weeks, when you feel rested, and dress to be comfortable.

12-Minute Swimming Test

Distance (Yards) Swum in 12 Minutes

Fitness Category		Age (years) 13–19	20–29	30–39	40–49	50–59	60+
I. Very poor	(men)	<500*	<400	<350	<300	<250	<250
	(women)	<400	<300	<250	<200	<150	<150
II. Poor	(men)	500–599	400–499	350–449	300–399	250–349	250–299
	(women)	400–499	300–399	250–349	200–299	150–249	150–199
III. Fair	(men)	600–699	500–599	450–549	400–499	350–449	300–399
	(women)	500–599	400–499	350–449	300–399	250–349	200–299
IV. Good	(men)	700–799	600–699	550–649	500–599	450–549	400–499
	(women)	600–699	500–599	450–549	400–499	350–449	300–399
V. Excellent	(men)	>800	>700	>650	>600	>550	>500
	(women)	>700	>600	>550	>500	>450	>400

* < Means "less than"; > means "more than."

The Swimming test requires you to swim as far as you can in 12 minutes, using whatever stroke you prefer and resting as necessary, but trying for a maximum effort. The easiest way to take the test is in a pool with known dimensions, and it helps to have another person record the laps and time. Be sure to use a watch with a sweep second hand.

12-Minute Walking/Running Test

Distance (Miles) Covered in 12 Minutes

Fitness Category		Age (years) 13–19	20–29	30–39	40–49	50–59	60+
I. Very Poor	(men)	<1.30*	<1.22	<1.18	<1.14	<1.03	< .87
	(women)	<1.0	< .96	< .94	< .88	< .84	< .78
II. Poor	(men)	1.30–1.37	1.22–1.31	1.18–1.30	1.14–1.24	1.03–1.16	.87–1.02
	(women)	1.00–1.18	.96–1.11	.95–1.05	.88– .98	.84– .93	.78– .86
III. Fair	(men)	1.38–1.56	1.32–1.49	1.31–1.45	1.25–1.39	1.17–1.30	1.03–1.20
	(women)	1.19–1.29	1.12–1.22	1.06–1.18	.99–1.11	.94–1.05	.87– .98
IV. Good	(men)	1.57–1.72	1.50–1.64	1.46–1.56	1.40–1.53	1.31–1.44	1.21–1.32
	(women)	1.30–1.43	1.23–1.34	1.19–1.29	1.12–1.24	1.06–1.18	.99–1.09
V. Excellent	(men)	1.73–1.86	1.65–1.76	1.57–1.69	1.54–1.65	1.45–1.58	1.33–1.55
	(women)	1.44–1.51	1.35–1.45	1.30–1.39	1.25–1.34	1.19–1.30	1.10–1.18
VI. Superior	(men)	>1.87	>1.77	>1.70	>1.66	>1.59	>1.56
	(women)	>1.52	>1.46	>1.40	>1.35	>1.31	>1.19

* < Means "less than"; > means "more than."

1.5-Mile Run Test

Time (Minutes)

Fitness Category		Age (years) 13–19	20–29	30–39	40–49	50–59	60+
I. Very poor	(men)	>15:31*	>16:01	>16:31	>17:31	>19:01	>20:01
	(women)	>18:31	>19:01	>19:31	>20:01	>20:31	>21:01
II. Poor	(men)	12:11–15:30	14:01–16:00	14:44–16:30	15:36–17:30	17:01–19:00	19:01–20:00
	(women)	16:55–18:30	18:31–19:00	19:01–19:30	19:31–20:00	20:01–20:30	21:00–21:31
III. Fair	(men)	10:49–12:10	12:01–14:00	12:31–14:45	13:01–15:35	14:31–17:00	16:16–19:00
	(women)	14:31–16:54	15:55–18:30	16:31–19:00	17:31–19:30	19:01–20:00	19:31–20:30
IV. Good	(men)	9:41–10:48	10:46–12:00	11:01–12:30	11:31–13:00	12:31–14:30	14:00–16:15
	(women)	12:30–14:30	13:31–15:54	14:31–16:30	15:56–17:30	16:31–19:00	17:31–19:30
V. Excellent	(men)	8:37– 9:40	9:45–10:45	10:00–11:00	10:30–11:30	11:00–12:30	11:15–13:59
	(women)	11:50–12:29	12:30–13:30	13:00–14:30	13:45–15:55	14:30–16:30	16:30–17:30
VI. Superior	(men)	< 8:37	< 9:45	<10:00	<10:30	<11:00	<11:15
	(women)	<11:50	<12:30	<13:00	<13:45	<14:30	<16:30

* < Means "less than"; > means "more than."

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